

RECEIVED

MAY 07 2002

TECH CENTER 1600/2900



1600

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/591,447D

DATE: 04/29/2002

TIME: 16:41:15

Input Set : A:\KCO1003textfile.txt

Output Set: N:\CRF3\04292002\I591447D.raw

ENTERED

RECEIVED

MAY 07 2002

TECH CENTER 1600/2900

```

3 <110> APPLICANT: Chatfield, Steven N
4     Dougan, Gordon
5     Sydenham, Mark
7 <120> TITLE OF INVENTION: Vaccines Containing Attenuated Bacteria
9 <130> FILE REFERENCE: KCO1003US
11 <140> CURRENT APPLICATION NUMBER: US 09/591,447D
12 <141> CURRENT FILING DATE: 2001-06-09
14 <150> PRIOR APPLICATION NUMBER: UK 9726233.1
15 <151> PRIOR FILING DATE: 1997-12-11
17 <160> NUMBER OF SEQ ID NOS: 4
19 <170> SOFTWARE: MS-DOS
21 <210> SEQ ID NO: 1
22 <211> LENGTH: 1287
23 <212> TYPE: DNA
24 <213> ORGANISM: Salmonella typhimurium
26 <400> SEQUENCE: 1
28 atgaagaact ggaaaacgct gcttctcggt atcgccatga tcgcgaatac cagtttcgct      60
30 gccccccagg tagtcgataa agtcgcagcc gtcgtcaata atggcgctcg gctggaaagc      120
32 gacgttgatg gcttaatgca atcagtcaaa ctcaacgcgg gtcaggcagg tcagcagctt      180
34 ccggacgacg ccacgctgcg tcaccagatc ctggaacggt tgattatgga tcaaattatc      240
36 ctgcagatgg gtcagaagat gggggtgaag atcacggatg agcagttgga tcagccatca      300
38 gccaacatcg ccaaacaaaa caatatgacg atggatcaga tgcgcagccg tctggcttac      360
40 gatgggctga actattcaac ctaccgtaac cagattcgta aagagatgat tatctctgaa      420
42 gtgcgcaaca atgaggttcg tcgccgtatc accgttttgc cgcaagaagt tgacgcgctg      480
44 gcaaaacaga ttggcaccga aaacgatgcc agcacggagc tgaacctgag ccatatcctg      540
46 attgctctgc cggaaaaccc aacctccgag cagggttaacg acgcgcagcg ccaggcgga      600
48 agcattgttg aagaagcgcg taacggcgca gatttcggca aactggcgat tacctactct      660
50 gccgaccagc aggcgctaaa aggcggctcag atgggctggg gccgtatcca ggagctgccg      720
52 gggattttcg cccaggcgct gagcaccgcg aagaaaggcg acattgtcgg cccgattcgc      780
54 tccggcgctg gcttccacat tctgaaagta aatgacctgc gcggtcagag ccagagtatc      840
56 tccgtgaccg aagttcacgc tcgtcacatt ctgcttaagc cgtcgccgat catgaacgat      900
58 cagcaggcgc gcctgaagct ggaagaaatc gcggctgaca ttaagagtgg taaaaccacc      960
60 tttgcccgtg cggcgaaaga gtactctcag gaccgggct cgcgtaacca gggcggtgat      1020
62 ttgggttggg ctacgccaga tattttcgac ccggcggttc gcgacgcgct aacgaagctg      1080
64 cataaaggcc aaataagcgc gccggtacac tcctctttcg gctggcatct gatcgaattg      1140
66 ctggatacgc gtaaggtaga caaaaccgat gcggcgcgaga aagatcgcgc ttatcgtatg      1200
68 ctgatgaacc gtaaattctc agaagaagcg gcgacctgga tgcaagaaca gcgcgccact      1260
70 tacgttaaga ttttgagtaa ctaatga
73 <210> SEQ ID NO: 2
74 <211> LENGTH: 427
75 <212> TYPE: PRT
76 <213> ORGANISM: Salmonella typhimurium
78 <400> SEQUENCE: 2

```

RAW SEQUENCE LISTING

DATE: 04/29/2002

PATENT APPLICATION: US/09/591,447D

TIME: 16:41:15

Input Set : A:\KCO1003textfile.txt

Output Set: N:\CRF3\04292002\I591447D.raw

```

80 Met Lys Asn Trp Lys Thr Leu Leu Leu Gly Ile Ala Met Ile Ala Asn
81 1 5 10 15
83 Thr Ser Phe Ala Ala Pro Gln Val Val Asp Lys Val Ala Ala Val Val
84 20 25 30
86 Asn Asn Gly Val Val Leu Glu Ser Asp Val Asp Gly Leu Met Gln Ser
87 35 40 45
89 Val Lys Leu Asn Ala Gly Gln Ala Gly Gln Gln Leu Pro Asp Asp Ala
90 50 55 60
92 Thr Leu Arg His Gln Ile Leu Glu Arg Leu Ile Met Asp Gln Ile Ile
93 65 70 75 80
95 Leu Gln Met Gly Gln Lys Met Gly Val Lys Ile Thr Asp Glu Gln Leu
96 85 90 95
98 Asp Gln Pro Ser Ala Asn Ile Ala Lys Gln Asn Asn Met Thr Met Asp
99 100 105 110
101 Gln Met Arg Ser Arg Leu Ala Tyr Asp Gly Leu Asn Tyr Ser Thr Tyr
102 115 120 125
104 Arg Asn Gln Ile Arg Lys Glu Met Ile Ile Ser Glu Val Arg Asn Asn
105 130 135 140
107 Glu Val Arg Arg Arg Ile Thr Val Leu Pro Gln Glu Val Asp Ala Leu
108 145 150 155 160
110 Ala Lys Gln Ile Gly Thr Gln Asn Asp Ala Ser Thr Glu Leu Asn Leu
111 165 170 175
113 Ser His Ile Leu Ile Ala Leu Pro Glu Asn Pro Thr Ser Glu Gln Val
114 180 185 190
116 Asn Asp Ala Gln Arg Gln Ala Glu Ser Ile Val Glu Glu Ala Arg Asn
117 195 200 205
119 Gly Ala Asp Phe Gly Lys Leu Ala Ile Thr Tyr Ser Ala Asp Gln Gln
120 210 215 220
122 Ala Leu Lys Gly Gly Gln Met Gly Trp Gly Arg Ile Gln Glu Leu Pro
123 225 230 235 240
125 Gly Ile Phe Ala Gln Ala Leu Ser Thr Ala Lys Lys Gly Asp Ile Val
126 245 250 255
128 Gly Pro Ile Arg Ser Gly Val Gly Phe His Ile Leu Lys Val Asn Asp
129 260 265 270
131 Leu Arg Gly Gln Ser Gln Ser Ile Ser Val Thr Glu Val His Ala Arg
132 275 280 285
134 His Ile Leu Leu Lys Pro Ser Pro Ile Met Asn Asp Gln Gln Ala Arg
135 290 295 300
137 Leu Lys Leu Glu Glu Ile Ala Ala Asp Ile Lys Ser Gly Lys Thr Thr
138 305 310 315 320
140 Phe Ala Ala Ala Ala Lys Glu Tyr Ser Gln Asp Pro Gly Ser Ala Asn
141 325 330 335
143 Gln Gly Gly Asp Leu Gly Trp Ala Thr Pro Asp Ile Phe Asp Pro Ala
144 340 345 350
146 Phe Arg Asp Ala Leu Thr Lys Leu His Lys Gly Gln Ile Ser Ala Pro
147 355 360 365
149 Val His Ser Ser Phe Gly Trp His Leu Ile Glu Leu Leu Asp Thr Arg
150 370 375 380
152 Lys Val Asp Lys Thr Asp Ala Ala Gln Lys Asp Arg Ala Tyr Arg Met

```

RAW SEQUENCE LISTING

DATE: 04/29/2002

PATENT APPLICATION: US/09/591,447D

TIME: 16:41:15

Input Set : A:\KC01003textfile.txt

Output Set: N:\CRF3\04292002\I591447D.raw

```

153 385          390          395          400
155 Leu Met Asn Arg Lys Phe Ser Glu Glu Ala Ala Thr Trp Met Gln Glu
156          405          410          415
158 Gln Arg Ala Thr Tyr Val Lys Ile Leu Ser Asn
159          420          425
162 <210> SEQ ID NO: 3
163 <211> LENGTH: 1287
164 <212> TYPE: DNA
165 <213> ORGANISM: Escherichia coli
167 <400> SEQUENCE: 3
169 atgaagaact ggaaaacgct gcttctcggt atcgccatga tcgcgaatac cagtttcgct      60
171 gccccccagg tagtcgataa agtcgcagcc gtcgtcaata acggcgtcgt gctggaaagc      120
173 gacgttgatg gattaatgca gtcggtaaaa ctgaacgctg ctcaggcaag gcagcaactt      180
175 cctgatgacg cgacgctgcg ccaccaaatac atggaacggt tgatcatgga tcaaatacatt      240
177 ctgcagatgg ggcagaaaaat gggagtgaat atctccgatg agcagctgga tcaggcgatt      300
179 gctaacatcg cgaaacagaa caacatgacg ctggatcaga tgcgcagccg tctggcttac      360
181 gatggactga actacaacac ctatcgtaac cagatccgca aagagatgat tatctctgaa      420
183 gtgcgtaaca acgaggtgcg tcgtcgcatc accatcctgc cgcaggaagt cgaatccctg      480
185 gcgcagcagg tgggtaacca aaacgacgcc agcactgagc tgaacctgag ccacatcctg      540
187 atcccgtgct cggaaaaccc gacctctgat caggtgaacg aagcggaaaag ccaggcgcg      600
189 gccattgtcg atcaggcgcg taacggcgct gatttcggta agctggcgat tgctcattct      660
191 gccgaccagc aggcgctgaa cggcggccag atgggctggg gccgtattca ggagttgccc      720
193 gggatcttcg ccacggcatt aagcaccgcg aagaaaggcg acattgttg cccgattcgt      780
195 tccggcggtg gcttccatat tctgaaagtt aacgacctgc gcggcgaaa caaaaatata      840
197 tcggtgaccg aagttcatgc tcgccatatt ctgctgaaac cgtcgccgat catgactgac      900
199 gaacaggccc gtgtgaaact ggaacagatt gctgctgata tcgagagtgg taaaacgact      960
201 tttgctgccg caacgaaaga gttctctcag gatccagtct ctgctaacca gggcggcgat      1020
203 ctgggtgggg ctacaccaga tattttcgat ccggccttcc gtgacgccct gactcgccctg      1080
205 aacaaaggtc aatgagtgac accggttcac tcttcattcg gctggcattt aatcgaactg      1140
207 ctggataccc gtaatgtcga taaaaccgac gctgcgcaga aagatcgtgc ataccgcatg      1200
209 ctgatgaacc gtaagtcttc ggaagaagca gcaagctgga tgcaggaaca acgtgccagc      1260
211 gcctacgtta aaatcctgag caactaa                                1287
214 <210> SEQ ID NO: 4
215 <211> LENGTH: 428
216 <212> TYPE: PRT
217 <213> ORGANISM: Escherichia coli
219 <400> SEQUENCE: 4
221 Met Lys Asn Trp Lys Thr Leu Leu Leu Gly Ile Ala Met Ile Ala Asn
222 1          5          10          15
224 Thr Ser Phe Ala Ala Pro Gln Val Val Asp Lys Val Ala Ala Val Val
225          20          25          30
227 Asn Asn Gly Val Val Leu Glu Ser Asp Val Asp Gly Leu Met Gln Ser
228          35          40          45
230 Val Lys Leu Asn Ala Ala Gln Ala Arg Gln Gln Leu Pro Asp Asp Ala
231          50          55          60
233 Thr Leu Arg His Gln Ile Met Glu Arg Leu Ile Met Asp Gln Ile Ile
234 65          70          75          80
236 Leu Gln Met Gly Gln Lys Met Gly Val Lys Ile Ser Asp Glu Gln Leu
237          85          90          95

```

RAW SEQUENCE LISTING

DATE: 04/29/2002

PATENT APPLICATION: US/09/591,447D

TIME: 16:41:15

Input Set : A:\KCO1003textfile.txt

Output Set: N:\CRF3\04292002\I591447D.raw

```

239 Asp Gln Ala Ile Ala Asn Ile Ala Lys Gln Asn Asn Met Thr Leu Asp
240      100      105      110
242 Gln Met Arg Ser Arg Leu Ala Tyr Asp Gly Leu Asn Tyr Asn Thr Tyr
243      115      120      125
245 Arg Asn Gln Ile Arg Lys Glu Met Ile Ile Ser Glu Val Arg Asn Asn
246      130      135      140
248 Glu Val Arg Arg Arg Ile Thr Ile Leu Pro Gln Glu Val Glu Ser Leu
249 145      150      155      160
251 Ala Gln Gln Val Gly Asn Gln Asn Asp Ala Ser Thr Glu Leu Asn Leu
252      165      170      175
254 Ser His Ile Leu Ile Pro Leu Pro Glu Asn Pro Thr Ser Asp Gln Val
255      180      185      190
257 Asn Glu Ala Glu Ser Gln Ala Arg Ala Ile Val Asp Gln Ala Arg Asn
258      195      200      205
260 Gly Ala Asp Phe Gly Lys Leu Ala Ile Ala His Ser Ala Asp Gln Gln
261      210      215      220
263 Ala Leu Asn Gly Gly Gln Met Gly Trp Gly Arg Ile Gln Glu Leu Pro
264 225      230      235      240
266 Gly Ile Phe Ala Gln Ala Leu Ser Thr Ala Lys Lys Gly Asp Ile Val
267      245      250      255
269 Gly Pro Ile Arg Ser Gly Val Gly Phe His Ile Leu Lys Val Asn Asp
270      260      265      270
272 Leu Arg Gly Glu Ser Lys Asn Ile Ser Val Thr Glu Val His Ala Arg
273      275      280      285
275 His Ile Leu Leu Lys Pro Ser Pro Ile Met Thr Asp Glu Gln Ala Arg
276      290      295      300
278 Val Lys Leu Glu Gln Ile Ala Ala Asp Ile Glu Ser Gly Lys Thr Thr
279 305      310      315      320
281 Phe Ala Ala Ala Thr Lys Glu Phe Ser Gln Asp Pro Val Ser Ala Asn
282      325      330      335
284 Gln Gly Gly Asp Leu Gly Trp Ala Thr Pro Asp Ile Phe Asp Pro Ala
285      340      345      350
287 Phe Arg Asp Ala Leu Thr Arg Leu Asn Lys Gly Gln Met Ser Ala Pro
288      355      360      365
290 Val His Ser Ser Phe Gly Trp His Leu Ile Glu Leu Leu Asp Thr Arg
291      370      375      380
293 Asn Val Asp Lys Thr Asp Ala Ala Gln Lys Asp Arg Ala Tyr Arg Met
294 385      390      395      400
296 Leu Met Asn Arg Lys Phe Ser Glu Glu Ala Ala Ser Trp Met Gln Glu
297      405      410      415
299 Gln Arg Ala Ser Ala Tyr Val Lys Ile Leu Ser Asn
300      420      425

```

VERIFICATION SUMMARY

PATENT APPLICATION: US/09/591,447D

DATE: 04/29/2002

TIME: 16:41:16

Input Set : A:\KCO1003textfile.txt

Output Set: N:\CRF3\04292002\I591447D.raw